

METHOD FOR SYNCHRONIZING DATA UTILIZED IN REDUNDANT,  
CLOSED LOOP CONTROL SYSTEMS

ABSTRACT

A method for synchronizing data utilized in a redundant, closed-loop feedback control system is disclosed. In an exemplary embodiment, the method includes configuring a plurality of control nodes within the control system, with each of the plurality of control nodes transmitting and receiving data through a common communication bus. At each of the plurality of control nodes during a given control loop time  $T = N$ , the receipt of externally generated data with respect to each control node is verified, the externally generated data having been generated during a preceding control loop time  $T = N-1$ . At each of the plurality of control nodes during the given control loop time  $T = N$ , output control data is calculated using the externally generated data. During the given control loop time  $T = N$ , the calculated output control data from each individual control node is further transmitted over the communication bus to be later utilized by other control nodes during a subsequent control loop time  $T = N+1$ .

5 data through a common communication bus. At each of the plurality of control nodes during a given control loop time  $T = N$ , the receipt of externally generated data with respect to each control node is verified, the externally generated data having been generated during a preceding control loop time  $T = N-1$ . At each of the plurality of control nodes during the given control loop time  $T = N$ , output control data is calculated using the externally generated data. During the given control loop time  $T = N$ , the calculated output control data from each individual control node is further transmitted over the communication bus to be later utilized by other control nodes during a subsequent control loop time  $T = N+1$ .

10 time  $T = N$ , output control data is calculated using the externally generated data. During the given control loop time  $T = N$ , the calculated output control data from each individual control node is further transmitted over the communication bus to be later utilized by other control nodes during a subsequent control loop time  $T = N+1$ .

2011010 - DECEMBER 01 2010